



REMARKS

Claims 1 to 18 and 20 to 69 are in the case.

Claim 1 has been amended to recite that the fuel blend comprises an oxygen-containing component and that the said oxygen-containing component provides substantially all of the oxygen derived from the fuel blend during the combustion of the fuel. Claim 1 has been further amended to recite that the oxygen-containing component consists essentially of one or more of the defined compounds. In addition, claim 1 has been amended to require that the oxygen-containing component is present in the fuel blend in sufficient amounts to provide an oxygen-content of the fuel blend of at least 1% by weight. Basis for this feature is to be found in the specification from line 14 of page 16 to line 4 of page 17.

Claims 38 to 41, directed to the fuel blend further containing an alcohol as a further, possibly significant component, have been cancelled.

Claims 65 to 69 have been cancelled.

The Applicant reserves the right to pursue the subject matter of the claims cancelled by way of this response by way of one or more continuing applications.

The present invention concerns a fuel blend containing an oxygen-containing component and to the oxygen-containing component itself in the form of an additive. The oxygen-containing component contains compounds which provide oxygen during the combustion cycle of an internal combustion engine for combustion with the fuel. As noted in the specification, the form of oxygen provision during combustion is to be contrasted with the conventional manner of providing all the oxygen required during combustion by mixing the fuel with an oxygen-containing gas, most commonly air. Thus, in a typical scenario, the fuel blend of the present invention would be mixed with air and the resulting mixture fed to the inlet tract of an internal combustion engine.



Oxygen would be provided for the combustion of the fuel from both the oxygen-containing components in the fuel blend itself, as well as the air.

The oxygen provided during the combustion cycle of the engine by the fuel blend, that is derived from the fuel blend, is required in claim 1 as amended herein to be provided by the defined oxygen-containing component.

Claim 1 has been further amended to recite that the oxygen-containing component consists essentially of one or more of the esters of Formula I as defined in claim 1. As noted in the specification and as pointed out in the previous response to Office Action, the major part or majority of the oxygen derived from the fuel blend is provided by the one or more compounds of Formula I. Claim 1 as now amended requires that essentially all of the oxygen is derived from such compounds. Other oxygen containing compounds, such as alcohols, may be present in the fuel blend as stabilizers, as defined in claims 32 to 37. However, the quantity of such stabilizers is very low, compared with the quantity of compound of Formula I present, as the stabilizing function is provided by only very low concentrations of the stabilizer compound. This is reflected in claim 1 as amended, by the reference now introduced to the oxygen-containing component consisting essentially of the compound of Formula I.

Rejection under 35 U.S.C. § 102

We note that the rejections under 35 U.S.C. § 102(b) include rejections of claim 19. However, this claim was cancelled by way of the previous response to Office Action, the subject matter of claim 19 being incorporated into claim 1.

Claims 1 to 3, 5 to 7, 9, 11, 19, 32 to 35, 38, 41 and 44 of this application stand rejected under 35 U.S.C. § 102(b) as being anticipated by Killick (WO95/02654). This rejection is respectfully traversed.

As noted in the previous response to Office Action, Killick is concerned with a fuel blend including a hydrocarbon liquid and up to 20% ethanol and/or n-propanol. The

fuel blend also contains up to 15% by volume of a fatty acid and/or organic ester. The examples in Killick all describe fuel blends comprising ethyl acetate. In all cases, the ethyl acetate is present in the blend in only relatively small amounts (from 2.5% to 5.0%) together with much larger volumes of ethanol (15%).

It is clear that the fuel blend of Killick has an alcohol, such as ethanol, as the major oxygen-providing agent. The ethyl acetate is present only in minor amounts and, as such, is not the major oxygen-providing agent in the blend. Further, the large amounts of alcohol present in the fuel blend of Killick make it clear that the oxygen-containing component does not consist essentially of the acetate. There is no teaching in Killick to use an oxygen-containing component that consists essentially of an acetate or ester.

It is made clear in the specification of Killick at lines 22 to 25 of page 2 that the ethyl acetate is present as a coupling agent, in order to ensure that the alcohol and fuel remain in a single phase. Killick is not using the acetate as a source of oxygen, in particular as the major oxygen-providing agent. The quantities of ethyl acetate required to perform the coupling duty are much lower than the volumes of alcohol present in the blend. Indeed, reducing the alcohol content of the fuel of Killick would also reduce the quantity of coupling agent required. Thus, the fuel blend of Killick can never comprise an oxygen-containing component consisting essentially of an ester, such as ethyl acetate. The fuel blends of Killick are excluded from claim 1 as now amended.

For the above reasons, it is submitted that the fuel blend of claim 1 is not anticipated by Killick. Claims 2 to 44, being dependent from claim 1, are also not anticipated by Killick.

Claims 1, 6, 14, 19, 32 to 34, and 38 to 40 of this application stand rejected under 35 U.S.C. § 102(b) as being anticipated by Sieg (US Patent 3,903,251). This rejection is respectfully traversed.

As noted in the last response to Office Action, Sieg is concerned with a process for producing a high octane unleaded gasoline, the process comprising oxidizing isobutane to form tertiary butyl alcohol. The process relies upon the use of acetic acid in

this reaction, the bulk of which is removed in a subsequent separation step. Any remaining acetic acid in the mixture of tertiary butyl alcohol and water is present only in very minor amounts, as indicated in lines 1 to 8 of column 7 of Sieg. This small amount of acetic acid is converted by esterification into butyl acetate. The resulting mixture of water and butyl alcohol contains only a few tenths percent of butyl acetate (typically 0.5%). This mixture is then blended with gasoline to produce the high octane fuel.

The major oxygen-providing agent in the fuel blend of Sieg is tertiary butyl alcohol. It is this component that is responsible for the high octane number of the fuel produced in the process. Any acetate in the mixture is only present in the final fuel blend in extremely small quantities. The acetate is not the major oxygen-providing agent in the final fuel blend. The vast majority of the oxygen derived from the fuel blend of Sieg is provided by the tertiary butyl alcohol. The oxygen-containing component of the fuel blend of Sieg does not consist essentially of one or more esters of Formula I of claim 1, but rather is a component consisting essentially of tertiary butyl alcohol. The fuel blend of Sieg is thus clearly excluded by the wording of claim 1 as now amended.

For the above reasons, it is submitted that the fuel blend of claim 1 is not anticipated by Sieg. Claims 2 to 40, being dependent from claim 1, are also not anticipated by Sieg.

Claims 1 to 3, 5 to 11, 14, 19, 32 to 35, and 43 to 44 of this application stand rejected under 35 U.S.C. § 102(b) as being anticipated by Smith (US Patent 4,394,133). This rejection is respectfully traversed.

As noted in the previous response to Office Action, Smith is directed to the use of alkyl acetates as phase separation inhibitors in fuels containing hydrocarbons and ethanol. At lines 36 to 39 of column 2 Smith indicates that the fuel is most likely gasoline and the mixture contains from 80 and 99 percent gasoline and from 1 to 20 percent ethanol. The amount of inhibitor that is present in the fuel mixture is dependent upon the percentage of water present in the fuel. Example 1 of Smith concerns a gasohol product containing 90

percent gasoline and 9.59 percent ethanol. The inhibitor was present in amounts of 0.1 and 0.4 %.

The fuel blend of Smith does not comprise an oxygen-containing component which consists essentially of an ester of Formula I of claim 1 of this application. It is clear that the fuel composition of Smith contains an inhibitor, such as an acetate, only in sufficient amounts to prevent phase separation occurring. Accordingly, the fuel contains only very low amounts of the acetate, in relation to the amount of alcohol present. The oxygen derived from the fuel blend of Smith is provided almost exclusively by the alcohol, with just the merest fraction coming from the inhibitor. Clearly, the fuel blends of Smith are excluded from claim 1 as now amended.

For these reasons, it is submitted that the fuel blend of claim 1 is not anticipated by Smith. Claims 2 to 44, being dependent from claim 1, are also not anticipated by Smith.

Claims 1 to 4, 6 to 8, 11, 19, 32 to 34, and 43 to 44 of this application stand rejected under 35 U.S.C. § 102(b) as being anticipated by Mayerhoff (US Patent 3,869,262). This rejection is respectfully traversed.

As previously noted, Mayerhoff is directed to fuel compositions containing oxygen-containing hydrocarbon compounds of a given formula (see the abstract of Mayerhoff). The fuel composition of Mayerhoff comprises at least 3 oxygen-containing compounds, in particular at least one acetal, and at least 2 further compounds selected from acetals, alcohols and acetates. Reference is made to Mayerhoff at lines 55 to 67 of column 5. The key examples of Mayerhoff relate to a fuel mixture containing an additive consisting of 30 parts of methanol, 20 parts of methylal, 30 parts of methylacetate and 20 parts of isopropanol. It is clear that the fuel mixture of Mayerhoff, while it may contain an acetate, contains significant amounts of other oxygenate compounds, such as alcohols. In the case of Examples 9 and 10, the 30 parts of methyl acetate are accompanied by 50 parts of alcohol and a further 20 parts of methylal. Accordingly, it can be seen that, again, Mayerhoff is not using the acetate as the major oxygen-providing agent in the

additive or fuel composition. On the contrary, Mayerhoff is teaching that the acetate must be accompanied by greater amounts of other oxygenate compounds. It is certainly the case that Mayerhoff does not teach a fuel blend having an oxygen-containing component that consists essentially of an ester of Formula I of claim 1. Rather, the teaching of Mayerhoff is to provide the fuel blend with an oxygen-containing component in which an ester is only a very minor component. Indeed, Mayerhoff is teaching that an ester is not an essential component of the fuel blend at all. The essential component is an acetal, which must be present in major quantities in all the blends of Mayerhoff.

For these reasons, it is submitted that the fuel blend of claim 1 is not anticipated by Mayerhoff. Claims 2 to 44, being dependent from claim 1, are also not anticipated by Mayerhoff.

Claims 1 to 3, 4 to 7, 9, 11, 19, 32 to 35, 38 to 40, and 43 to 44 of this application stand rejected under 35 U.S.C. § 102(b) as being anticipated by Tunison (US Patent 1,423,048). This rejection is respectfully traversed.

Tunison is concerned with providing fuel compositions using as a basic ingredient heavy oil. As noted in the previous response to Office Action, this heavy oil is the product remaining after the distillation of a crude oil to produce the conventional fuel fractions, such as gasoline. Reference is made to Tunison at lines 94 to 106 of column 1. Tunison teaches nothing which relates to the formulation of gasoline or diesel fuels. Rather, Tunison is concerned with the ability to use the heavy fractions of the crude starting material. Evidence of this is to be found in claim 1 of Tunison, which refers to a fuel which is more dense than kerosene. This necessarily excludes gasoline and diesel fuels. For this reason alone, claim 1 of this application, which is limited to fuel blends of gasoline or diesel, cannot be anticipated by Tunison.

To render this heavy oil useful as a fuel, Tunison blends it with more volatile components, such as ethers, alcohols and esters. Examples 2 and 3 of Tunison, referred to by the Examiner in the previous Office Action, contain significant quantities of alcohols as the major oxygen-providing component. Clearly, this fuel blend does not fall

within the scope of claim 1 of this application as now amended. Claim 1 requires that the oxygen-containing component consists essentially of an ester of Formula I.

Example 6 of Tunison is excluded from claim 1, in that the fuel blend consists of heavy oil as the fuel component. Such fuel blends are excluded from claim 1 which, as noted above, is limited to gasoline and diesel fuels.

For these reasons, it is submitted that the fuel blend of claim 1 is not anticipated by Tunison. Claims 2 to 44, being dependent from claim 1, are also not anticipated by Tunison.

Claims 1 and 15 to 18 of this application stand rejected under 35 U.S.C. § 102(b) as being anticipated by or in the alternative under 35 U.S.C. § 103(a) as obvious over Dorer (US Patent 3,658,495). This rejection is respectfully traversed.

Dorer is concerned with compositions for use as fuels and cleaning agents for fuel systems comprising a combination of oxy compounds and ashless dispersants. Dorer discloses a wide range of oxy compounds, included in the fuel blend for their cleaning action. As such, Dorer discloses only very minor amounts of the oxy compounds. This is consistent with the teaching of Dorer to include only sufficient cleaning agents and dispersants to perform their recited function. Indeed, the person of ordinary skill in the art would readily understand the need to keep the content of such components to an absolute minimum. Dorer does not disclose a fuel blend of gasoline or diesel in which an oxygen-containing component consisting essentially of an ester of Formula I is present in an amount to provide an oxygen-content of at least 1% by weight, as now defined in claim 1 of this application.

For these reasons, it is submitted that the fuel blend of claim 1 is not anticipated or rendered obvious by Dorer. Claims 15 to 18, being dependent from claim 1, are also not anticipated by Dorer.



Rejection under 35 U.S.C. § 103

Claims 38 to 40 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Killick (WO 95/02654). Claims 38 to 40 have been cancelled, as noted above.

Claim 42 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Killick (WO 95/02654) and Dorer (US Patent 3,658,495) as applied to claims 1 and 15 to 18 and further in view of Gyimah (US Patent No. 5,302,595). This rejection is respectfully traversed.

As noted above, the fuel blends of claim 1 of this application, as now amended are not disclosed in either of Killick or Dorer. There is no teaching or suggestion in either document to provide a fuel blend of gasoline or diesel having an oxygen-content of at least 1% by weight provided by an oxygen-containing component consisting essentially of an ester of Formula I.

Gyimah relates to certain compounds and their use as biocides. A great range of possible uses for the compounds is disclosed in Gyimah, in particular in columns 8 to 11. A number of fuels are indicated in column 9 as being possible applications for the compounds. No details are given regarding the fuels, in particular regarding their composition and nature. In particular, there is no teaching or suggestion in Gyimah that could lead the person of ordinary skill in the art to provide a fuel blend having all the features of claim 1 as now amended and including a biocide. In short, Gyimah adds nothing to the teaching of Killick and Dorer which could lead the skilled person to the fuel blends of claim 1.

Accordingly, for these reasons and the reasons given above for the patentability of claims 1 and 15 to 18, it is submitted that claim 42 is not obvious in the light of Gyimah.

Applicant submits that the claims of this application, as herein amended, are directed to allowable subject matter. Accordingly, reconsideration and withdrawal of all

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outstanding rejections and allowance of the claims at an early date are hereby respectfully requested.


Respectfully submitted,

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Michael P. Hartmann